Notebook Summary for HF ApRES Experiments

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Friday 11th February 2022

Contents

1 Database Structure

1.1 Table 'measurements'

Table 1: Specification for `measurements` table.

Fieldname	Datatype	Parameters	Description
measurement_id	INTEGER	PRIMARY KEY	Unique identifier for each file.
filename	TEXT	NOT NULL	Filename without path.
path	TEXT	UNIQUE NOT NULL	Path to file in UNIX form, relative to top-level project root.
name	TEXT	-	The name associated with the measurement, used to group sets of measurements together.
timestamp	TEXT	UNIQUE ASC NOT NULL	`YYYY-mm-dd HH:MM:SS.fff` formatted timestamp according to time and date the measurement was taken.
valid	INTEGER	NOT NULL DEFAULT 0	Boolean indicator of whether file is valid. Assumes invalid by default.
base_visible	INTEGER	NOT NULL DEFAULT 0	Boolean indicator of whether basal reflector is visible in range data.
base_range_min	REAL	NOT NULL DEFAULT -1	Minimum range (in steps of 50m) at which basal reflector can be found.
base_range_max	REAL	NOT NULL DEFAULT -1	Maximum range (in steps of 50m) at which basal reflector can be found.
location	TEXT	-	Measurement location name.
comments	TEXT	-	Description and comments for measurement if relevant.
latitude	REAL	-	Latitude of measurement location if known.

Table 1: Specification for `measurements` table.

Fieldname	**Datatype**	**Parameters**	**Description**
longitude	REAL	-	Longitude of measurement location if known.
elevation	REAL	-	Elevation of measurement location if known (referenced to WGS84).

1.2 Table 'apres_metadata'

The fields `id` and `burst_id` make a unique pair to ensure that each burst within a `*.dat` file is only represented once.

Table 2: Specification for `apres_metadata` table.

Fieldname	Datatype	Parameters	Description
id	INTEGER	PRIMARY KEY	Unique identifier for metadata. Distinct from `measurement_id` in that each `*.dat` file can have multiple bursts.
burst_id	INTEGER	NOT NULL	Identifies the burst within a `*.dat` the metadata represents.
measurement_id	INTEGER	NOT NULL	Identifies the file record where the metadata originates from.
ApRES Specific Metadata			
timestamp	TEXT	NOT NULL	`YYYY-mm-dd HH:MM:SS.fff` formatted timestamp as logged in `*.dat` file.
n_attenuators	INTEGER	NOT NULL CHECK(>0, <5)	Number of attenuator settings used.
n_chirps	INTEGER	NOT NULL CHECK(>0)	Total number of individual chirps in file.
n_subbursts	INTEGER	NOT NULL CHECK(>0)	Number of sub-bursts (repeats) of the burst configuration.
period	REAL	NOT NULL CHECK(>0)	Chirp period in seconds.
f_lower	REAL	NOT NULL CHECK($\geq$ 0)	Lower bound of chirp ramp in Hertz.
f_upper	REAL	NOT NULL CHECK($\geq$ 0)	Upper bound of chirp ramp in Hertz.
af_gain	TEXT	NOT NULL	Comma separated values indicating AF gain settings.
rf_attenuator	TEXT	NOT NULL	Comma separated values indicating RF attenuator settings.

Table 2: Specification for `apres_metadata` table.

Fieldname	Datatype	Parameters	Description
f_sampling	REAL	NOT NULL CHECK(>0)	Sampling frequency.
tx_antenna	TEXT	NOT NULL	Transmit antenna selection in comma separated value format.
rx_antenna	TEXT	NOT NULL	Receive antenna selection in comma separated value format.
power_code	INTEGER	-	DDS output current power code, if available (dependent on firmware).
battery_voltage	REAL	-	Battery voltage, if available.
temperature_1	REAL	-	Measured board temperature from sensor 1.
temperature_2	REAL	-	Measured board temperature from sensor 2.
rmb_issue	TEXT	-	RMB issue number if available.
vab_issue	TEXT	-	VAB issue number if available.
venom_issue	TEXT	-	Venom issue number if available.
software_issue	TEXT	-	VAB firmware issue number if available.

1.3 Table 'data'

Table 3: Specification for data table.

Fieldname	Datatype	Parameters	Description
data_id	INTEGER	PRIMARY KEY	Unique identifier for each data item stored in /Proc.
measurement_id	INTEGER	NOT NULL	Linked identified to measurements table for source of data.
filename	TEXT	NOT NULL	Filename for processed data item stored in /Proc.
path	TEXT	NOT NULL	Path to file in UNIX form, relative to top-level project root.
timestamp	TEXT	ASC NOT NULL	YYYY-mm-dd HH:MM:SS.SSS formatted timestamp corresponding to time at which data was processed.
processing_steps	TEXT	-	Description of processing steps used to produced data file.

2 Testing

2.1 Monday 27th December 2021

20:43:06 `2021-12-27_214306.dat` Measurement taken south west of storaage container at Neumayer III

2.2 Tuesday 28th December 2021

2.3 Wednesday 29th December 2021